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L1: Entry 1 of 2

File: JPAB

Feb 13, 2001

PUB-NO: JP02001039115A
DOCUMENT-IDENTIFIER: JP 2001039115 A
TITLE: PNEUMATIC TIRE

PUBN-DATE: February 13, 2001

INVENTOR-INFORMATION:

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BRIDGESTONE CORP

APPL-NO: JP11214378

APPL-DATE: July 28, 1999

INT-CL (IPC): B60 C 11/00; B60 C 11/04

ABSTRACT:

PROBLEM TO BE SOLVED: To prevent degradation of the draining property associated with reduction in volume in a tread groove in the middle to ending period of the traveling so that the wet performance such as the hydroplaning resistance is excellent until the middle to ending period of the traveling.

SOLUTION: This tire has a tread pattern including a plurality of groove parts with a tread 1 extending in the circumferential direction, and a plurality of ribs 3 divided by these groove parts 2a. A rubber B peelable from a tread rubber A is arranged in the circumferential direction inside the tread rubber A to constitute at least one row of ribs 3 and on a belt or a breaker 4 so that the rubber B is exposed on a tread part of the rid in and after the middle period of the wear of the tread rubber A.

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L1: Entry 2 of 2

File: DWPI

Feb 13, 2001

DERWENT-ACC-NO: 2001-239476

DERWENT-WEEK: 200147

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TITLE: Pneumatic tire has rubber layer in rib which peels with tread rubber and is exposed to rib tread portion after abrasion of tread rubber

PATENT-ASSIGNEE:

ASSIGNEE

CODE

BRIDGESTONE CORP

BRID

PRIORITY-DATA: 1999JP-0214378 (July 28, 1999)

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PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<input type="checkbox"/> JP 2001039115 A	February 13, 2001		005	B60C011/00

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP2001039115A	July 28, 1999	1999JP-0214378	

INT-CL (IPC): [B60 C 11/00](#); [B60 C 11/04](#)

ABSTRACTED-PUB-NO: JP2001039115A

BASIC-ABSTRACT:

NOVELTY - Pneumatic tire has a row of ribs (3) on the belt (4). Rib consists of a rubber layer (B) provided inside the tread rubber (A). The rubber (B) exposes to the rib tread portion after the abrasion of the tread rubber (A).

DETAILED DESCRIPTION - Pneumatic tire has the rubber (B) provided along the radial direction of the tire at a depth of 30 to 60% of the main channel depth from the tread (1). The internal side surface of the rubber (B) is 1.5 mm or more from the outermost belt layer and is in substantial same position as the bottom of the main groove. The width of the rubber (B) along axial direction is narrower than the width of the rib along tire axial direction. The adhesive property of the rubber (B) gets reduced when it is exposed to the rib tread portion with abrasion of tread rubber (A). The rubber (B) is arranged in all ribs of the tread.

USE - Pneumatic tire.

ADVANTAGE - A new step is generated when the rubber falls out by peeling with the

tread rubber due to abrasion in transit. The volume reduction of the tread groove is complemented by the appearance of the starting new groove. Reduction of drainage is prevented and the wet performance of the tire e.g. hydroplaning resistant property is excelled.

DESCRIPTION OF DRAWING(S) - The figure shows the sectional drawing of the tread portion of the pneumatic tire.

Tread 1

Rib 3

Belt 4

Rubbers A,B

CHOSEN-DRAWING: Dwg.1/3

TITLE-TERMS: PNEUMATIC RUBBER LAYER RIB PEEL TREAD RUBBER EXPOSE RIB TREAD PORTION
AFTER ABRASION TREAD RUBBER

DERWENT-CLASS: A95 Q11

CPI-CODES: A12-T01B;

ENHANCED-POLYMER-INDEXING:

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Q9212 ; K9416 ; B9999 B5301 B5298 B5276

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C2001-072196

Non-CPI Secondary Accession Numbers: N2001-171499

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【特許請求の範囲】

【請求項1】 環状に形成されたトレッド部と、該トレッド部の両端からタイヤ半径方向内側に配設された一对のサイドウォール部と、該サイドウォール部のタイヤ半径方向内側に連なるビード部とを具備し、前記トレッド部が周方向に延びる複数の溝部とこれら溝部によって区分された複数のリブとを含むトレッドパターンを有する空気入りタイヤにおいて、

少なくとも1列の前記リブを構成するトレッドゴム

(A) 中でかつベルトまたはブレイカー上に、該トレッドゴム(A)と剥離可能な関係にあるゴム(B)が、該トレッドゴム(A)の摩耗中期以降に該リブ踏面部に露出するように周方向に配設されてなることを特徴とする空気入りタイヤ。

【請求項2】 前記ゴム(B)のタイヤ径方向外側面がトレッド踏面部から主溝深さの30～60%範囲内に位置する請求項1記載の空気入りタイヤ。

【請求項3】 前記ゴム(B)のタイヤ径方向内側面がベルトまたはブレイカーのタイヤ径方向最外層表面から1.5mm以上で、かつ実質的に主溝底と同じ位置にある請求項1または2記載の空気入りタイヤ。

【請求項4】 前記ゴム(B)のタイヤ軸方向の幅が前記リブのタイヤ軸方向の幅よりもせまく、3～10mmである請求項1～3のうちいずれか一項記載の空気入りタイヤ。

【請求項5】 前記ゴム(A)と前記ゴム(B)との接着性は、トレッドゴム(A)の摩耗により前記ゴム(B)がリブ踏面部に露出すると、該ゴム(B)が摩耗する前に脱落し得る程度である請求項1～4のうちいずれか一項記載の空気入りタイヤ。

【請求項6】 前記ゴム(B)が全てのリブ内に配設されている請求項1～5のうちいずれか一項記載の空気入りタイヤ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、走行によるトレッドの摩耗中後期における湿潤路面に対する排水性能、制動性能、耐ハイドロプレーニング性など(以下「ウェット性能」と総称する)の低下を抑制した空気入りタイヤに関するものである。

【0002】

【従来の技術】従来、空気入りタイヤのウェット性能を向上させるには、均一なトレッドゴムを使用し、パターン設計により排水性を向上させ、また同時にトレッドのゴム質により路面との摩擦係数 μ を向上させる手法が主に採られてきた。

【0003】

【発明が解決しようとする課題】しかしながら、かかる手法は、走行の初期には目標とするウェット性能を確保することができても、走行の中後期にかけてゴム物性が

変化(硬化)する他に、トレッドの溝の容積減少に伴う排水性が低下し、これによるウェット性能の低下は避けられなかった。

【0004】そこで本発明の目的は、走行中後期におけるトレッド溝の容積減少に伴う排水性の低下を防止し、走行中後期まで優れたウェット性能を有する空気入りタイヤを提供することにある。

【0005】

【課題を解決するための手段】本発明者は、上記課題を解決すべく鋭意検討した結果、走行中後期において摩耗によりトレッドゴムと剥離可能な関係にあるゴムを露出させ、かつ該ゴムを脱落させて新たな段差を生ぜしめ、かかる新たな溝の出現によりトレッド溝の容積減少を補完し、排水性の低下を防止することができることを見出し、本発明を完成するに至った。即ち、本発明の空気入りタイヤは下記に示す通りである。

【0006】(1)環状に形成されたトレッド部と、該トレッド部の両端からタイヤ半径方向内側に配設された一对のサイドウォール部と、該サイドウォール部のタイヤ半径方向内側に連なるビード部とを具備し、前記トレッド部が周方向に延びる複数の溝部とこれら溝部によって区分された複数のリブとを含むトレッドパターンを有する空気入りタイヤにおいて、少なくとも1列の前記リブを構成するトレッドゴム(A)中でかつベルトまたはブレイカー上に、該トレッドゴム(A)と剥離可能な関係にあるゴム(B)が、該トレッドゴム(A)の摩耗中期以降に該リブ踏面部に露出するように周方向に配設されてなることを特徴とする空気入りタイヤである。走行によりトレッドゴム(A)が摩耗すると、内部のゴム

(B)が表面に露出して容易にトレッドゴム(A)から脱落し得ることから、タイヤ表面に周方向に連続した新たな溝が形成され、走行中後期まで優れたウェット性能が得られる。

【0007】(2)前記(1)の空気入りタイヤにおいて、前記ゴム(B)のタイヤ径方向外側面がトレッド踏面部から主溝深さの30～60%範囲内に位置する空気入りタイヤである。トレッドゴム(A)が30%減少する前にゴム(B)が露出してしまうと、新たな溝形成時にパターン剛性が低下し、操縦安定性に悪影響を及ぼし、一方、トレッドゴム(A)が60%減少してもゴム(B)が露出しない場合には、ウェット性能の低下が大きくなる。

【0008】(3)前記(1)または(2)の空気入りタイヤにおいて、前記ゴム(B)のタイヤ径方向内側面がベルトまたはブレイカーのタイヤ径方向最外層表面から1.5mm以上で、かつ実質的に主溝底と同じ位置にある空気入りタイヤである。前記ゴム(B)とベルトまたはブレイカーまでの間隔が1.5mm未満になると、新たに形成した溝の溝底ゲージが1.5mm未満と薄くなるため、更に走行を続けたときのゴムの劣化により溝

底に亀裂が生じ、耐久性が低下する。

【0009】(4)前記(1)～(3)のいずれかの空気入りタイヤにおいて、前記ゴム(B)のタイヤ軸方向の幅が前記リブのタイヤ軸方向の幅よりもせまく、3～10mmである空気入りタイヤである。この幅は新たに形成する溝幅に相当するが、この幅が3mm未満ではウェット性能の向上効果が少なく、一方、10mmを超えると操縦安定性の低下が大きくなり、好ましくない。

【0010】(5)前記(1)～(4)のいずれかの空気入りタイヤにおいて、前記ゴム(A)と前記ゴム(B)との接着性は、トレッドゴム(A)の摩耗により前記ゴム(B)がリブ踏面部に露出すると、該ゴム(B)が摩耗する前に脱落し得る程度である空気入りタイヤである。これにより、ゴム(B)が露出したときに人為的にゴム(B)をトレッドゴム(A)から引き剥すことなく新たな溝を形成させることができる。

【0011】(6)前記(1)～(5)のいずれかの空気入りタイヤにおいて、前記ゴム(B)が全てのリブ内に配設されている空気入りタイヤである。これにより、摩耗によるトレッド溝の容積減少が十分に補完され、摩耗中期以降のウェット性能の低下を効果的に防止することができる。

【0012】

【発明の実施の形態】本発明においては、図1に示すように、トレッド1が、周方向に延びる複数の溝部2aとこれら溝部2aによって区分された複数のリブ3とを含むトレッドパターンを有し、このリブ3を構成するトレッドゴム(A)中でかつベルトまたはブレーカー4上に、トレッドゴム(A)と剥離可能な関係にあるゴム(B)が配設されている。このゴム(B)は、走行によるトレッドの摩耗中期以降において、リブ3を構成するトレッドゴム(A)の踏面部の一部に露出するように周方向に配設されている。

【0013】走行による摩耗中期以降にトレッドゴム(A)のリブ踏面部の一部にゴム(B)が露出すると、このゴム(B)がトレッドゴム(A)から容易に脱落し得る材質とすることから、図2の(イ)および(ロ)に示すように、ゴム(B)の脱落により新たな溝2bが生じる。この結果、摩耗中期以降においてもトレッド溝の容積減少が補完され、排水性の低下を防ぐことができ、ハイドロプレーニングの発生を抑えることができる。

【0014】使用するトレッドゴム(A)のゴム種としては、天然ゴム(NR)、ポリスチレンブタジエンゴム(SBR)、ポリブタジエンゴム(BR)、ポリイソブレンゴム(IR)や、その他のゴムとのブレンドを用いることができ、特に制限されるべきものではなく、従来より慣用されている配合系を用いることができる。またかかるゴム成分の他、カーボンブラック等の充填剤、老化防止剤、ワックス、加硫促進剤、加硫剤、軟化剤等を適宜配合することができる。

【0015】また、ゴム(B)についてはトレッドゴム(A)との関係で、ゴム(B)がリブ踏面部に露出すると走行により脱落し得る程度の接着性を有するものを選定すればよく、特に制限されるべきものではない。慣用されているトレッドゴム(A)の一般的な材質のものに対してはゴム(B)として、例えば、屈曲亀裂抵抗性の小さいアクリロニトリルブタジエンゴム(NBR)系のものを好適に挙げることができる。

【0016】あるいはまた、図3の(イ)に示すように先ずトレッドゴム(A)にゴム(B)用の溝5を配置し、その中にブチルゴム100%のゴムセメント6を周囲に塗ったゴム(B)を(ロ)に示すようにはめ込む。次いで、その上に(ハ)に示すようにトレッドゴム(A)と同種のゴムシートを張り付け、しかる後、これをトレッドゴムとして成型、加硫して、(ニ)に示すトレッドを得る。ゴム(B)にブチルゴムのセメントを塗ることによって、ゴム(B)がゴム(A)と接着せずに容易に脱落し得るようになる。

【0017】本発明の空気入りタイヤにおいて、トレッドゴム(A)内におけるゴム(B)の配置は、ゴム(B)の径方向外側面がトレッド踏面部から主溝2a深さの30～60%範囲内に位置することが好ましく、またゴム(B)の径方向内側面がベルトまたはブレーカー4のタイヤ径方向最外層表面から1.5mm以上で、かつ実質的に主溝底と同じ位置にあることが好ましい。さらに、ゴム(B)のタイヤ軸方向の幅は、リブ3のタイヤ軸方向の幅よりもせまく、好ましくは3～10mmである。

【0018】本発明においては、複数のリブ3の夫々に対応してゴム(B)を配設しても、あるいは中央のリブ3のみに配設してもよいが、より高いウェット性能を得るためには多くのリブ3にゴム(B)を配設することが好ましい。

【0019】なお、本発明の空気入りタイヤは、トレッド部以外の構造は空気入りタイヤとして既に知られている構造を採用することができ、特に変更を要するものではない。

【0020】

【実施例】次に本発明を実施例に基づいて説明する。

40 実施例

4本の周方向溝を有するトレッドパターンを有するサイズ215/65R15の空気入りタイヤにおいて、図1に示すように、トレッドゴム(A)中に該トレッドゴム(A)と剥離可能な関係にあるゴム(B)を周方向に配設した。トレッドゲージaが11mm、溝深さbが8.5mm、ゴム(B)のタイヤ径方向外側面からトレッド踏面部までの距離cが4mm(主溝深さの47%)、ゴム(B)のタイヤ径方向内側面からベルトまでの距離dが2.5mm、ゴム(B)のタイヤ軸方向の幅eが6mmである。尚、トレッドゴム(A)と剥離可能なゴム

(B)は、図3に示すように、ゴム(B)の周囲にブチルゴム100%のゴムセメントを塗り付けることにより設けた。

【0021】比較例

ゴム(B)を用いずにトレッドを全て上記トレッドゴム(A)で構成した以外は全て実施例と同様に空気入りタイヤを試作した。

【0022】実施例および比較例のタイヤについて、新品時および摩耗時(トレッドゴムが4mm摩耗)の直進ハイドロブレーニング性、並びに湿潤路面における操縦安定性(ウェット操縦安定性)および乾燥路面における操縦安定性(ドライ操縦安定性)についてそれぞれ実車走行試験を行った。試験方法は下記に示す通りである。なお、実施例のタイヤにおいては摩耗時にゴム(B)が脱落し、新たな溝が形成されていた。

*

*【0023】(1)直進ハイドロブレーニング性

水深5mmのプールに進入したときのハイドロブレーニング発生限界速度を測定し、新品時を100として指数表示した。数値が大なる程結果が良好である。

【0024】(2)ウェット操縦安定性

ウェット路面で種々のモードで走行したときのフィーリングを新品時を100として指数表示した。数値が大なる程結果が良好である。

【0025】(3)ドライ操縦安定性

ドライ路面で種々のモードで走行したときのフィーリングを新品時を100として指数表示した。数値が大なる程結果が良好である。得られた結果を下記の表1に示す。

【0026】

【表1】

	新品時		摩耗時	
	比較例	実施例	比較例	実施例
直進ハイドロブレーニング性(指数)	100	100	78	95
ウェット操縦安定性(指数)	100	100	92	98
ドライ操縦安定性(指数)	100	100	108	103

【0027】

【発明の効果】以上説明してきたように、本発明の空気入りタイヤにおいては、走行中後期において摩耗によりトレッドゴムと剥離可能な関係にあるゴムが露出し、かつ該ゴムが脱落して新たな段差が生じ、かかる新たな溝の出現によりトレッド溝の容積減少が補完され、排水性の低下を防止することができる。この結果、走行中後期まで優れたウェット性能が得られる。

【図面の簡単な説明】

【図1】本発明の実施例の空気入りタイヤのトレッド部を拡大して示す断面図である。

【図2】本発明の一例空気入りタイヤのトレッド部の走

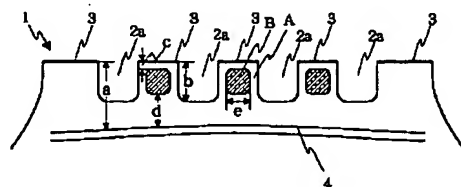
※行中後期の摩耗による新たな溝の発生を示す説明図である。

【図3】本発明の空気入りタイヤの製造例を示す説明図である。

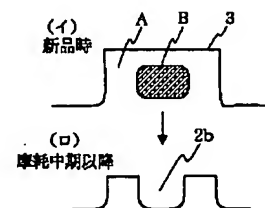
【符号の説明】

- 1 トレッド
- 2 a, 2 b 溝
- 3 リブ
- 4 ベルトまたはブレーカー
- 5 ゴム(B)用の溝
- 6 ゴムセメント

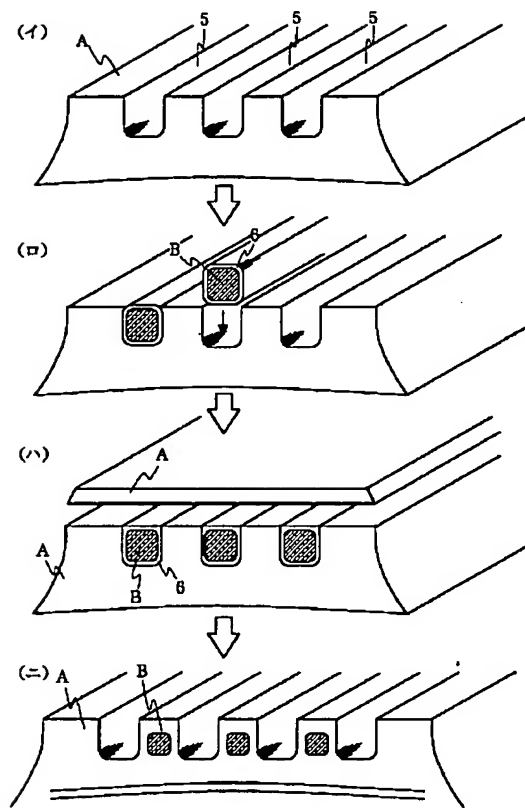
【図1】



【図2】



【図3】



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the pneumatic tire which controlled the fall (it is named the "wet engine performance" generically below) of the wastewater engine performance and braking engine performance to the humid road surface of the wear Nakaato term of the tread by transit, hydroplaning-proof nature, etc.

[0002]

[Description of the Prior Art] In order to raise the wet engine performance of a pneumatic tire conventionally, the technique of using uniform tread rubber, and raising wastewater nature by the pattern design, and raising the coefficient of friction μ with a road surface by the gum of a tread to coincidence has mainly been taken.

[0003]

[Problem(s) to be Solved by the Invention] However, even if the technique of starting could secure the target wet engine performance in early stages of transit, the wastewater nature accompanying [apply to the Nakaato term of transit, and rubber physical properties change (hardening), and also] volume reduction of the slot on the tread fell, and the wet performance degradation by this was not avoided.

[0004] Then, the purpose of this invention prevents the fall of the wastewater nature accompanying volume reduction of the tread groove of a transit Nakaato term, and is to offer the pneumatic tire which has the wet engine performance excellent in the transit Nakaato term.

[0005]

[Means for Solving the Problem] this invention person exposes the rubber which has the relation in which tread rubber and exfoliation are possible by wear at a transit Nakaato term, as a result of inquiring wholeheartedly that the above-mentioned technical problem should be solved, and omit this rubber, a new level difference is made to produce, volume reduction of a tread groove is complemented with the advent of the starting new slot, and it came to complete [that the fall of wastewater nature can be prevented, and] a header and this invention. That is, the pneumatic tire of this invention is as being shown below.

[0006] (1) The tread section formed annularly and the sidewall section of the pair arranged in the tire radial inside from the both ends of this tread section, In the pneumatic tire which has a tread pattern containing two or more slots where the toe of bead which stands in a row inside [tire radial] this sidewall section is provided, and said tread section is prolonged in a hoop direction, and two or more ribs classified by these slots In the tread rubber (A) which constitutes said rib of at least 1 train, and on a belt or a breaker It is the pneumatic tire characterized by being arranged in a hoop direction and this tread rubber (A) and the rubber (B) which has the relation which can be exfoliated becoming so that it may expose to this rib tread section on and after the wear middle of this tread rubber (A). If tread rubber (A) is worn out by transit, since internal rubber (B) is exposed to a front face and may fall out from tread rubber (A) easily, the new slot which followed the hoop direction is formed in a tire front face, and the wet engine performance excellent in the transit Nakaato term is obtained.

[0007] (2) In the pneumatic tire of the above (1), it is the pneumatic tire with which the direction lateral surface of the diameter of a tire of said rubber (B) is located in within the limits 30 - 60% of the major groove depth from the tread tread section. When rubber (B) will not be exposed even if pattern rigidity falls at the time of new slot formation, it has a bad influence on driving stability and tread rubber (A) decreases 60% on the other hand if rubber (B) is exposed before tread rubber (A) decreases 30%, wet performance degradation becomes large.

[0008] (3) In the above (1) or the pneumatic tire of (2), it is the pneumatic tire which whose direction medial surface of the diameter of a tire of said rubber (B) is 1.5mm or more, and has it in the same location as a major groove bottom substantially from the direction of diameter of tire outermost layer front face of a belt or a breaker. If spacing to said rubber (B) and belt, or a breaker is set to less than 1.5mm, since the groove bottom gage of the newly formed slot will become thin with less than 1.5mm, a crack arises in a groove bottom by degradation of the rubber when continuing transit further, and endurance falls.

[0009] (4) The above (1) In one pneumatic tire of - (3), the width of face of the tire shaft orientations of said rubber (B) is narrower than the width of face of the tire shaft orientations of said rib, and it is the pneumatic tire which is 3-10mm. Although it is equivalent to the newly formed flute width, the improvement effectiveness of the wet engine performance has little this width of face at less than 3mm, the fall of driving stability becomes large and this width of face is not desirable, if it exceeds 10mm on the other hand.

[0010] (5) The above (1) In one pneumatic tire of - (4), the adhesive property of said rubber (A) and said rubber (B) is a pneumatic tire which is extent which may drop out before wearing this rubber (B) out, when said rubber (B) is exposed to the rib tread section with wear of tread rubber (A). A new slot can be made to form, without lengthening and removing rubber (B) from tread rubber (A) artificially by this, when rubber (B) is exposed.

[0011] (6) The above (1) In one pneumatic tire of - (5), said rubber (B) is the pneumatic tire currently arranged in all ribs. Thereby, volume reduction of the tread groove by wear is fully complemented, and can prevent effectively the wet performance degradation on and after the wear middle.

[0012]

[Embodiment of the Invention] As this invention is shown in drawing 1, it has a tread pattern containing two or more ribs 3 classified by two or more slot 2a with which a tread 1 is prolonged in a hoop direction, and these slot 2a, and it is among the tread rubber (A) which constitutes this rib 3, and the rubber (B) which has the relation in which tread rubber (A) and exfoliation are possible on a belt or a breaker 4 is arranged. This rubber (B) is arranged in the hoop direction so that it may expose to a part of tread section of the tread rubber (A) which constitutes a rib 3 on and after the wear middle of the tread by transit.

[0013] If rubber (B) is exposed to a part of rib tread section of tread rubber (A) on and after the wear middle by transit, since this rubber (B) will consider as the quality of the material which may drop out of tread rubber (A) easily, as shown in (**) and (**) of drawing 2, new slot 2b arises according to omission of rubber (B). Consequently, volume reduction of a tread groove can be complemented on and after the wear middle, the fall of wastewater nature can be prevented, and generating of hydroplaning can be suppressed.

[0014] As a rubber kind of the tread rubber (A) to be used, the blend with natural rubber (NR), polystyrene butadiene rubber (SBR), polybutadiene rubber (BR), polyisoprene rubber (IR), and other rubber can be used, it should not be restricted especially, and the combination system used commonly conventionally can be used. Moreover, bulking agents, such as carbon black besides this rubber component, an antioxidant, a wax, a vulcanization accelerator, a vulcanizing agent, a softener, etc. can be blended suitably.

[0015] Moreover, about rubber (B), it is relation with tread rubber (A), and if rubber (B) is exposed to the rib tread section, it should not be restricted especially that what is necessary is just to select what has the adhesive property of extent which may drop out by transit. To the thing of the general quality of the material of the tread rubber (A) used commonly, the thing of an acrylonitrile-butadiene rubber (NBR)

system for example, with small flex crack resistance can be suitably mentioned as rubber (B).

[0016] Or as shown in (**) of drawing 3, the slot 5 for rubber (B) is first arranged to tread rubber (A) again, and into it, the rubber (B) which applied isobutylene-isoprene-rubber 100% rubber cement 6 to the perimeter is inserted in, as shown in (b). Subsequently, on it, as shown to (Ha), tread rubber (A) and a rubber sheet of the same kind are stuck, it is cast and vulcanized after an appropriate time, using this as tread rubber, and the tread shown in (d) is obtained. By applying the cement of isobutylene isoprene rubber to rubber (B), rubber (B) may come to fall out easily, without pasting up with rubber (A).

[0017] It sets to the pneumatic tire of this invention, and it is desirable that the direction lateral surface of a path of rubber (B) is located in within the limits 30 - 60% of the major groove 2a depth from the tread tread section, and, as for arrangement of the rubber (B) in tread rubber (A), it is desirable that the direction medial surface of a path of rubber (B) is in the same location as a major groove bottom substantially [are 1.5mm or more and] from the direction of diameter of tire outermost layer front face of a belt or a breaker 4. Furthermore, the width of face of the tire shaft orientations of rubber (B) is narrower than the width of face of the tire shaft orientations of a rib 3, and is 3-10mm preferably.

[0018] In this invention, although rubber (B) may be arranged corresponding to each of two or more ribs 3 or you may arrange only in the central rib 3, in order to obtain the higher wet engine performance, it is desirable to arrange rubber (B) in many ribs 3.

[0019] In addition, structures other than the tread section can adopt the structure already known as a pneumatic tire, and the pneumatic tire of this invention does not require especially modification.

[0020]

[Example] Next, this invention is explained based on an example.

In the size 215 which has the tread pattern which has the hoop direction slot of four examples / pneumatic tire of 65R15, as shown in drawing 1, this tread rubber (A) and the rubber (B) which has the relation which can be exfoliated were arranged in the hoop direction into tread rubber (A). For the distance c from 8.5mm and the direction lateral surface of the diameter of a tire of rubber (B) to the tread tread section, the distance d from 4mm (47% of the major groove depth) and the direction medial surface of the diameter of a tire of rubber (B) to a belt is [the tread gage a / 11mm and channel depth b / the width of face e of 2.5mm and the tire shaft orientations of rubber (B)] 6mm. In addition, tread rubber (A) and the rubber (B) which can be exfoliated were prepared in the perimeter of rubber (B) by applying isobutylene-isoprene-rubber 100% rubber cement, as shown in drawing 3.

[0021] The pneumatic tire was made as an experiment like the example except [all] having constituted all treads from above-mentioned tread rubber (A), without using the example rubber of a comparison (B).

[0022] The real vehicle driving test was performed in the rectilinear-propagation hydroplaning nature at the time of a new article and wear (tread rubber is worn out 4mm), and a list, respectively about driving stability [in / tire / of an example and the example of a comparison / a humid road surface] (wet driving stability), and the driving stability (dry driving stability) in a desiccation road surface. A test method is as being shown below. In addition, in the tire of an example, dedropping and a new slot were formed for rubber (B) at the time of wear.

[0023] (1) The hydroplaning generating critical speed when advancing into a pool with a rectilinear-propagation hydroplaning nature depth of 5mm was measured, and it indicated by the characteristic, having used the time of a new article as 100. A result is so good that a numeric value becomes size.

[0024] (2) The feeling when running in the modes various on a wet driving stability wet road surface was indicated by the characteristic, having used the time of a new article as 100. A result is so good that a numeric value becomes size.

[0025] (3) The feeling when running in the modes various on a dry driving stability dry road surface was indicated by the characteristic, having used the time of a new article as 100. A result is so good that a numeric value becomes size. The obtained result is shown in the following table 1.

[0026]

[Table 1]

	新品時		摩耗時	
	比較例	実施例	比較例	実施例
直進ハイドロプレーニング性 (指数)	100	100	78	95
ウェット操縦安定性 (指数)	100	100	92	98
ドライ操縦安定性 (指数)	100	100	108	103

[0027]

[Effect of the Invention] As explained above, in the pneumatic tire of this invention, the rubber which has the relation in which tread rubber and exfoliation are possible by wear at a transit Nakaato term is exposed, and this rubber falls out, a new level difference arises, volume reduction of a tread groove can be complemented with the advent of the starting new slot, and the fall of wastewater nature can be prevented. Consequently, the wet engine performance excellent in the transit Nakaato term is obtained.

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The tread section formed annularly and the sidewall section of the pair arranged in the tire radial inside from the both ends of this tread section, In the pneumatic tire which has a tread pattern containing two or more slots where the toe of bead which stands in a row inside [tire radial] this sidewall section is provided, and said tread section is prolonged in a hoop direction, and two or more ribs classified by these slots In the tread rubber (A) which constitutes said rib of at least 1 train, and on a belt or a breaker The pneumatic tire characterized by being arranged in a hoop direction and this tread rubber (A) and the rubber (B) which has the relation which can be exfoliated becoming so that it may expose to this rib tread section on and after the wear middle of this tread rubber (A).

[Claim 2] The pneumatic tire according to claim 1 with which the direction lateral surface of the diameter of a tire of said rubber (B) is located in within the limits 30 - 60% of the major groove depth from the tread tread section.

[Claim 3] The pneumatic tire according to claim 1 or 2 which whose direction medial surface of the diameter of a tire of said rubber (B) is 1.5mm or more from the direction of diameter of tire outermost layer front face of a belt or a breaker, and is in the same location as a major groove bottom substantially.

[Claim 4] It is a pneumatic tire given in any 1 term among claims 1-3 the width of face of the tire shaft orientations of said rubber (B) is narrower than the width of face of the tire shaft orientations of said rib, and is [claims] 3-10mm.

[Claim 5] The adhesive property of said rubber (A) and said rubber (B) is a pneumatic tire given in any 1 term among claims 1-4 which are extent which may drop out before wearing this rubber (B) out, when said rubber (B) is exposed to the rib tread section with wear of tread rubber (A).

[Claim 6] It is a pneumatic tire given in any 1 term among claims 1-5 by which said rubber (B) is arranged in all ribs.

[Translation done.]